

AMENDMENTS TO THE CLAIMS

Claim 1-26 (Canceled)

27. (Currently Amended) A method of photoinducing at least one linear and/or non-linear optical property in a structure comprising at least one photosensitive molecular material, the method comprising:

~~and of using said structure, in which method irradiating~~ said structure is ~~irradiated~~ with at least two mutually coherent write light beams to modify the orientation of the molecules of said molecular material and/or the nature of the molecules as a function of their orientation, ~~characterized in that~~ said structure is a confining structure, in that the write beams are parallel to a confinement direction or oblique relative thereto and distribute the linear and/or non-linear optical property(ies) over said confining structure in at least one direction perpendicular to said confinement direction, and

~~in that causing~~ one or more "pump" beams ~~is/are caused~~ to propagate in or through said photoinduced structure, with propagation thereof in or through said photoinduced structure generating an optical effect giving rise to a property in one or more "read" beams propagating in guided configuration in the photoinduced confining structure.

28. (Currently Amended) ~~A~~ The method according to claim 27, ~~characterized in that~~ wherein the confining structure is scanned with at least one write light beam, and in that one (or more) parameters of at least one of the write beams is/are controlled as a function of relative displacement between said structure and said scanning beam(s).

29. (Currently Amended) ~~A~~ The method according to claim 28, ~~characterized in that~~ wherein the writing performed in the irradiated zone by the scanning beam(s) is tested and relative displacement of the confining structure and of the scanning beam(s) is controlled as a function of the result of the test.

30. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the write beams are irradiated through a lens and in that one or more parameters of at least one of the write beams is/are controlled.

31. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the write beams are irradiated through a mask, and in that one or more parameters of at least one of the write beams is/are controlled.

32. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the write beams are irradiated through a holographic structure, and in that one or more of the parameters of at least one of the write beams is/are controlled.

33. (Currently Amended) ~~A~~The method according to claim 32 ~~characterized in that~~wherein a parameter that is controlled on one or more of the write beams is beam intensity and/or polarization state and/or propagation direction and/or spatial overlap of a plurality of write beams and/or wavelength and/or relative phase between the beams.

34. (Currently Amended) ~~A~~The method according to claim 33, ~~characterized in that~~wherein a parameter is controlled by generating noise on said parameter and by controlling the statistical characteristics of said noise.

35. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the temperature of the molecular material is controlled.

36. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein said temperature is controlled by irradiation by means of an additional beam enabling local heating to be performed at the impact point of said write beams.

37. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the photoinduction beams write a quasi-phase matching grid for propagating the pump beam(s) and the read beams(s).

38. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the molecular material is previously oriented by applying an electric field and/or by heating.

39. (Currently Amended) ~~A~~The method according to claim 27, ~~characterized in that~~wherein the confining structure is a portion of film and/or a ribbon light guide which extends along the propagation direction of the read beam(s) and/or a microcavity in which the read beam(s) propagate(s) in a loop, and/or an optical fiber, and/or a combination of such elements.

Claims 40-52 (Canceled)

53. (Currently Amended) A method of photoinducing at least one linear and/or non-linear optical property in a structure comprising at least one photosensitive molecular material ~~and of using said structure, in which method, the method~~ comprising:

irradiating said structure ~~is irradiated~~ with a multiphoton write light beam to modify the orientation of the molecules of said molecular material and/or the nature of the molecules as a function of their orientation, ~~characterized in that~~ said structure is a confining structure, in that the write beams are parallel to a confinement direction or oblique relative thereto and distribute the linear and/or non-linear optical property(les) over said confining structure in at least one direction perpendicular to said confinement direction, and

causing in that one or more "pump" beams ~~is/are~~ caused to propagate in or through said photoinduced structure, with propagation thereof in or through said photoinduced structure generating an optical effect giving rise to a property in one or more "read" beams propagating in guided configuration in the photoinduced confining structure.

54. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the confining structure is scanned with at least one write light beam, and in that one (or more) parameters of at least one of the write beams

is/are controlled as a function of relative displacement between said structure and said scanning beam(s).

55. (Currently Amended) ~~A~~The method according to claim 54, ~~characterized in that~~wherein the writing performed in the irradiated zone by the scanning beam(s) is tested and relative displacement of the confining structure and of the scanning beam(s) is controlled as a function of the result of the test.

56. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the write beams are irradiated through a lens and in that one or more parameters of at least one of the write beams is/are controlled.

57. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the write beams are irradiated through a mask, and in that one or more parameters of at least one of the write beams is/are controlled.

58. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the write beams are irradiated through a holographic structure, and in that one or more of the parameters of at least one of the write beams is/are controlled.

59. (Currently Amended) ~~A~~The method according to claim 58 ~~characterized in that~~wherein a parameter that is controlled on one or more of the write beams is beam intensity and/or polarization state and/or propagation direction and/or spatial overlap of a plurality of write beams and/or wavelength and/or relative phase between the beams.

60. (Currently Amended) ~~A~~The method according to claim 59, ~~characterized in that~~wherein a parameter is controlled by generating noise on said parameter and by controlling the statistical characteristics of said noise.

61. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the temperature of the molecular material is controlled.

62. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein said temperature is controlled by irradiation by means of an additional beam enabling local heating to be performed at the impact point of said write beams.

63. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the photoinduction beams write a quasi-phase matching grid for propagating the pump beam(s) and the read beams(s).

64. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the molecular material is previously oriented by applying an electric field and/or by heating.

65. (Currently Amended) ~~A~~The method according to claim 53, ~~characterized in that~~wherein the confining structure is a portion of film and/or a ribbon light guide which extends along the propagation direction of the read beam(s) and/or a microcavity in which the read beam(s) propagate(s) in a loop, and/or an optical fiber, and/or a combination of such elements.

66. (Currently Amended) A method of photoinducing at least one linear and/or non-linear optical property in a structure comprising at least one photosensitive molecular material, the method comprising:

irradiating in which method said structure is ~~irradiated~~ with at least two mutually coherent write light beams which intensity, polarization states, relative phases, propagation directions, spatial overlap and wavelengths are controlled, to modify the orientation of the molecules of said molecular material and/or the nature of the molecules as a function of their orientation, ~~characterized in that~~ said structure is a confining structure, in that the write beams are parallel to a confinement direction or oblique relative thereto and distribute the linear and/or non-linear optical property(ies) over said confining structure in at least one direction perpendicular to said confinement direction, and

~~causing in that~~ one or more "pump" beams ~~is/are~~ caused to propagate in or through said photoinduced structure, with propagation thereof in or through said photoinduced structure generating an optical effect giving rise to a property in one or more "read" beams propagating in guided configuration in the photoinduced confining structure.

67. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the confining structure is scanned with at least one write light beam, and in that one (or more) parameters of at least one of the write beams is/are controlled as a function of relative displacement between said structure and said scanning beam(s).

68. (Currently Amended) ~~A~~The method according to claim 67, ~~characterized in that~~wherein the writing performed in the irradiated zone by the scanning beam(s) is tested and relative displacement of the confining structure and of the scanning beam(s) is controlled as a function of the result of the test.

69. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the write beams are irradiated through a lens and in that one or more parameters of at least one of the write beams is/are controlled.

70. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the write beams are irradiated through a mask, and in that one or more parameters of at least one of the write beams is/are controlled.

71. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the write beams are irradiated through a holographic structure, and in that one or more of the parameters of at least one of the write beams is/are controlled.

72. (Currently Amended) ~~A~~The method according to claim 71, ~~characterized in that~~wherein a parameter is controlled by generating noise on said parameter and by controlling the statistical characteristics of said noise.

73. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the temperature of the molecular material is controlled.

74. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein said temperature is controlled by irradiation by means of an additional beam enabling local heating to be performed at the impact point of said write beams.

75. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the photoinduction beams write a quasi-phase matching grid for propagating the pump beam(s) and the read beams(s).

76. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the molecular material is previously oriented by applying an electric field and/or by heating.

77. (Currently Amended) ~~A~~The method according to claim 66, ~~characterized in that~~wherein the confining structure is a portion of film and/or a ribbon light guide which extends along the propagation direction of the read beam(s) and/or a microcavity in which the read beam(s) propagate(s) in a loop, and/or an optical fiber, and/or a combination of such elements.

78. (Currently Amended) A method of photoinducing at least one linear and/or non-linear optical property in a structure comprising at least one photosensitive molecular material, the method comprising:

~~irradiating and of using said structure, in which method~~ said structure is ~~irradiated~~ with at least two mutually coherent write light beams which intensity, polarization states, relative phases, propagation directions, spatial overlap, wavelengths are controlled, to modify the orientation of the molecules of said molecular material and/or the nature of the molecules as a function of their orientation, ~~characterized in that~~ said structure is a confining structure, in that the write beams are parallel to a confinement direction or oblique relative thereto and distribute the linear and/or

non-linear optical property(ies) over said confining structure in at least one direction perpendicular to said confinement direction, and

~~causing in that~~ one or more "pump" beams ~~is/are caused to~~ propagate in or through said photoinduced structure, with propagation thereof in or through said photoinduced structure generating an optical effect giving rise to a property in one or more "read" beams propagating in guided configuration in the photoinduced confining structure.

79. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the confining structure is scanned with at least one write light beam, and in that one (or more) parameters of at least one of the write beams is/are controlled as a function of relative displacement between said structure and said scanning beam(s).

80. (Currently Amended) ~~A~~The method according to claim 79, ~~characterized in that~~wherein the writing performed in the irradiated zone by the scanning beam(s) is tested and relative displacement of the confining structure and of the scanning beam(s) is controlled as a function of the result of the test.

81. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the write beams are irradiated through a lens and in that one or more parameters of at least one of the write beams is/are controlled.

82. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the write beams are irradiated through a mask, and in that one or more parameters of at least one of the write beams is/are controlled.

83. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the write beams are irradiated through a holographic structure, and in that one or more of the parameters of at least one of the write beams is/are controlled.

84. (Currently Amended) ~~A~~The method according to claim 83, ~~characterized in that~~wherein a parameter is controlled by generating noise on said parameter and by controlling the statistical characteristics of said noise.

85. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the temperature of the molecular material is controlled.

86. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein said temperature is controlled by irradiation by means of an additional beam enabling local heating to be performed at the impact point of said write beams.

87. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the photoinduction beams write a quasi-phase matching grid for propagating the pump beam(s) and the read beams(s).

88. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the molecular material is previously oriented by applying an electric field and/or by heating.

89. (Currently Amended) ~~A~~The method according to claim 78, ~~characterized in that~~wherein the confining structure is a portion of film and/or a ribbon light guide which extends along the propagation direction of the read beam(s) and/or a microcavity in which the read beam(s) propagate(s) in a loop, and/or an optical fiber, and/or a combination of such elements.

Claims 90-101 (Canceled)

102. (Currently Amended) A method of photoinducing at least one linear and/or nonlinear optical property in a structure comprising at least one photosensitive molecular material ~~and of using said structure, in which method,~~ the method comprising:

irradiating said structure ~~is irradiated~~ with a multiphoton write light beam which intensity, polarization state, propagation direction, wave length, are controlled or

with at least two mutually coherent write light beams to modify the orientation of the molecules of said molecular material and/or the nature of the molecules as a function of their orientation, —~~characterized in that~~ said structure is a confining structure, in that the write beams are parallel to a confinement direction or oblique relative thereto and distribute the linear and/or non-linear optical property(ies) over said confining structure in at least one direction perpendicular to said confinement direction, and

causing in that one or more "pump" beams ~~is/are~~ caused to propagate in or through said photoinduced structure, with propagation thereof in or through said photoinduced structure generating an optical effect giving rise to a property in one or more "read" beams propagating in guided configuration in the photoinduced confining structure.

103. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the confining structure is scanned with at least one write light beam, and in that one (or more) parameters of at least one of the write beams is/are controlled as a function of relative displacement between said structure and said scanning beam(s).

104. (Currently Amended) ~~A~~The method according to claim 103, ~~characterized in that~~wherein the writing performed in the irradiated zone by the scanning beam(s) is tested and relative displacement of the confining structure and of the scanning beam(s) is controlled as a function of the result of the test.

105. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the write beams are irradiated through a lens and in that one or more parameters of at least one of the write beams is/are controlled.

106. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the write beams are irradiated through a mask, and in that one or more parameters of at least one of the write beams is/are controlled.

107. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the write beams are irradiated through a holographic

structure, and in that one or more of the parameters of at least one of the write beams is/are controlled.

108. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein a parameter is controlled by generating noise on said parameter and by controlling the statistical characteristics of said noise.

109. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the temperature of the molecular material is controlled.

110. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein said temperature is controlled by irradiation by means of an additional beam enabling local heating to be performed at the impact point of said write beams.

111. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the photoinduction beams write a quasi-phase matching grid for propagating the pump beam(s) and the read beams(s).

112. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the molecular material is previously oriented by applying an electric field and/or by heating.

113. (Currently Amended) ~~A~~The method according to claim 102, ~~characterized in that~~wherein the confining structure is a portion of film and/or a ribbon light guide which extends along the propagation direction of the read beam(s) and/or a microcavity in which the read beam(s) propagate(s) in a loop, and/or an optical fiber, and/or a combination of such elements.